



CalMAN 5 Walkthrough (part 1)

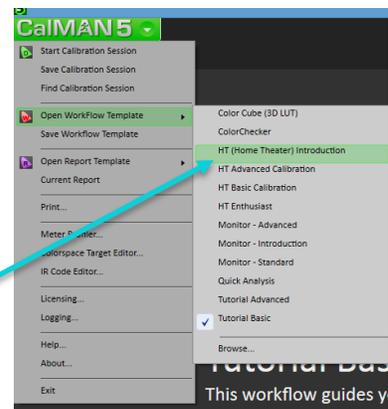
The following guide is intended to walk you through the setup and basic use of CalMAN 5 software for home theatres. This walkthrough uses the Tutorial Basic Workflow to introduce you to display calibration. With this workflow, you will adjust brightness, contrast, color,

tint, resolution, overscan, sharpness, grayscale, and colorspace on your television display.

Although the CalMAN 5 walkthrough in this guide is intended for first time users, all CalMAN 5 customers will make the same basic adjustments before continuing with more advanced calibrations.

Getting Started

After the software has been downloaded onto your computer, from spectracal.com, installed, and run, CalMAN 5 opens with an introduction workflow. The Introduction Workflow walks you through the layout of the CalMAN user interface. It's a good idea to reference this workflow throughout the calibration process if any directions seem unclear. The Introduction Workflow can be accessed via the CalMAN 5 drop down menu in the top left hand corner of your screen under "Open Workflow Template."



When you have completed the Introduction Workflow, CalMAN 5 allows you to select a calibration workflow. Any customer can access these workflows, without purchasing CalMAN 5 software, though they must purchase the software and licenses to connect to hardware and run display calibrations. For this CalMAN 5 walkthrough, select the Tutorial Workflow. (The Tutorial Workflow can also be accessed by selecting "Tutorial Basic" on the Workflow Template dropdown, pictured above) After you read the Tutorial Basic Workflow intro page, click **Next >>** in the lower right hand corner to continue through the tutorial.



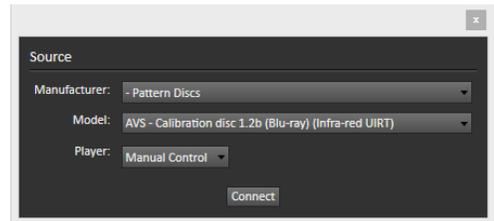
You should now be on the "Pattern Sources" page. This tutorial uses the AVS HD Blu-ray disc. If you do not have this disc, you can download it right from this Pattern Sources page and then

[Download Pattern Disc](#)

burn it to a disc. Click the "Download Pattern Disc" in the lower right corner of the page to download the disc image data.

Click **Next »** to advance to the “Source Connect” page.

Insert your AVS HD calibration disc into your Blu-ray player. Click the Find Source button, then choose the Manufacturer of the source; in this case it will be “- Pattern Discs”. In the Model dropdown, choose “AVS – Calibration disc 1.2b (Blu-ray) (Infra-red UIRT).” Leave Player on “Manual Control” and click the “Connect” button. Now click **Next »** to move on.



Getting Started

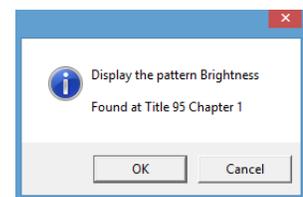
The next 2 pages go over information about Visual Settings, Display Modes and Dynamic Range. Review the information to help you to understand the following adjustment steps.

Now, insure that your television display is set to the correct user/picture mode, to be ready to begin the calibration process. These settings are usually accessed via the “Menu” button on your remote and should be under “Display Settings” or “Picture Controls.” You are looking for settings such as “Custom” or “User” that will allow you to personally adjust and customize the picture settings. Note that the method of adjusting these display settings will vary, depending on the type of display being used.

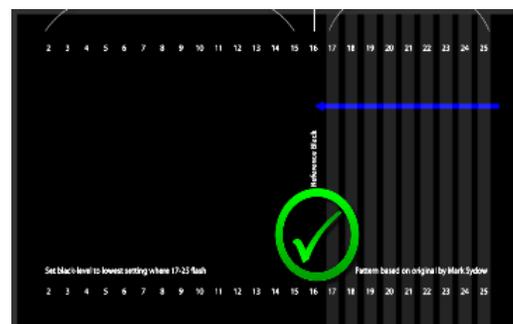
Click **Next »** to move on to the first adjustment, Brightness.

Adjusting Brightness

Click the **Brightness Pattern** button. A pop-up dialog will tell you where to select the Brightness pattern on your AVS HD calibration disc. Once selected, a pattern similar to that shown on the right hand side of your Tutorial page will appear on your television display. This pattern is used to properly adjust your display’s Brightness control.



Use the “Menu” button on your remote to find the brightness control on your display. Adjust the brightness control and note the changes to the pattern on the television screen. As you increase the display’s brightness, more of the numbered gray bars in the pattern will become visible. As you decrease the brightness settings, fewer of the gray bars will become visible. Adjust the display’s brightness until all bars



numbered 17 -25 are at least faintly visible, with all bars numbered 16 and below not visible at all. When brightness has been adjusted so that the pattern appears as described, you will have completed the necessary brightness adjustments for your display.

The images below demonstrate the significance of brightness adjustments to the viewing experience.

Before:



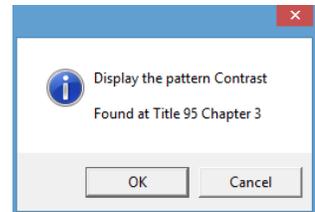
After:



Click **Next** » to move on to the next adjustment, Contrast.

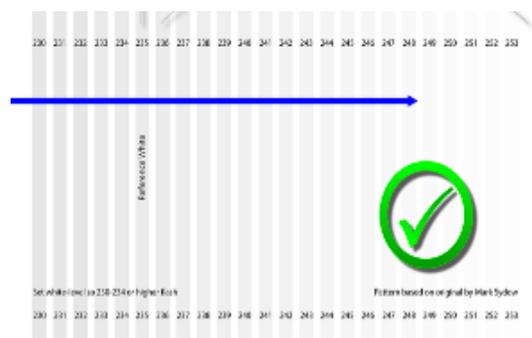
Adjusting Contrast

Click the **Contrast Pattern** button. A pop-up dialog will tell you where to select the Contrast pattern on your AVS HD calibration disc. Once selected, a pattern similar to that shown on the right hand side of your Tutorial page will appear on your television display. This is the pattern used to insure that your display's Contrast control is properly adjusted.



In the display's Picture menu, find the Contrast control. In each step of this walkthrough it is important to experiment with the extremes of different settings so you can better understand how setting adjustments change the appearance of the calibration patterns.

The majority of the numbered gray bars in the Contrast pattern should be visible, with the exception of bar 255. Adjust the display's Contrast control as high as possible, without losing bars at the bright end of the pattern (clipping) and without causing any of the gray bars to appear tinted, or cast with a pinkish or greenish hue.



Below is an example of proper brightness and contrast adjustments made to an image:

Before:



After:

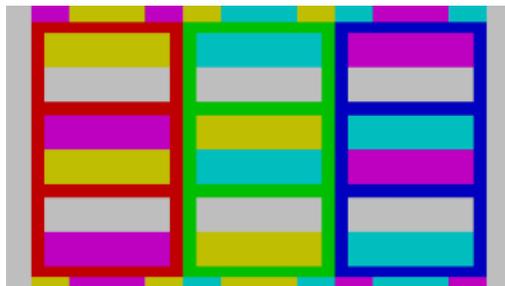


Click **Next »** to move on to the next adjustments, Color and Tint.

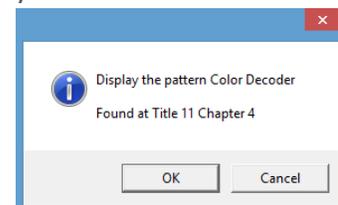
Adjusting Color and Tint

For most digital displays, the color and tint presets are accurate and will not need adjusting. In case color and tint are not accurately preset, we will cover their adjustment procedure. After you have reviewed the Color Decoder information page, advance to the Color Decoder adjustment page. Click the **Color and Tint Pattern** button on the adjustment page. A

pop-up dialog tells you where to select the Color Decoder pattern on your AVS HD calibration disc. Once selected, a pattern will appear on your display with white, plus the six primary and secondary video colors (blue, red,

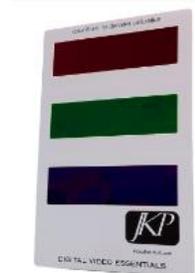


green, magenta, cyan, and yellow) partitioned into bars.



Adjusting a display's color and tint is the only calibration procedure that requires the use of a color filter

(shown at right). A color filter is shipped with some CalMAN software and hardware purchases. Otherwise, color filters can be ordered on SpectraCal's website for \$7.95. If you wish to proceed with the calibration process without ordering a color filter, feel free to skip this step, as any required color and tint adjustments on modern displays will be minimal.



If you have a color filter and would like to adjust color and tint, view the color and tint pattern on your monitor, while looking through the blue section of your filter. In the display's Picture menu, find the display's Color and Tint (Hue) controls. Adjust the Color control to minimize the visual difference between the blue and white portions of the pattern. Adjust the Tint control to minimize the visual difference between the blue and white portions of the pattern.



When done with this adjustment click **Next** ».

Below is an example of proper color and tint adjustments made to an image:

Before:



After:



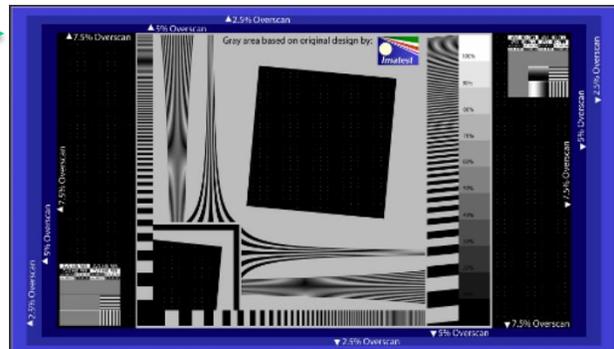
Adjusting Resolution/Bit-Accuracy

We will use one pattern from the AVS HD calibration disc to adjust three aspects of resolution and bit-accuracy. The pattern can be found on Track: 49, Chapter: 5 of your AVS HD calibration disc. Select the pattern from the disc to display the following pattern on your television display. Three areas within this pattern are utilized to check overscan, resolution, and sharpness.

Click **Next** » to advance to the Overscan page.

Overscan

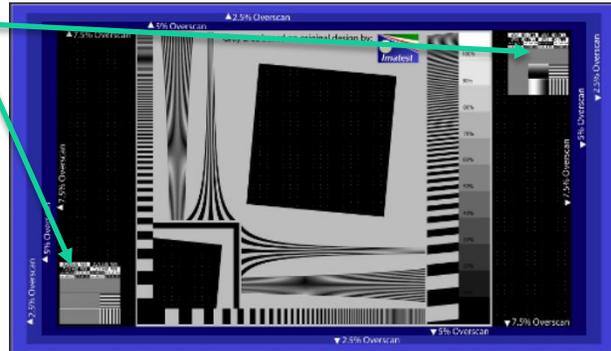
The blue frame bordering the pattern is used to insure that the picture size on your display has been properly selected. Find the Zoom or Aspect Ratio settings in the display's picture menu. These settings are often labeled "Standard," "Normal," "Full Screen," and/or "Widescreen." Note how each of the different settings changes the pattern on the display. Select the zoom/aspect ratio setting that shows the entire outermost square of the overscan pattern (including a purple line, one pixel in width).



Click **Next** » to advance to the Resolution page.

Resolution

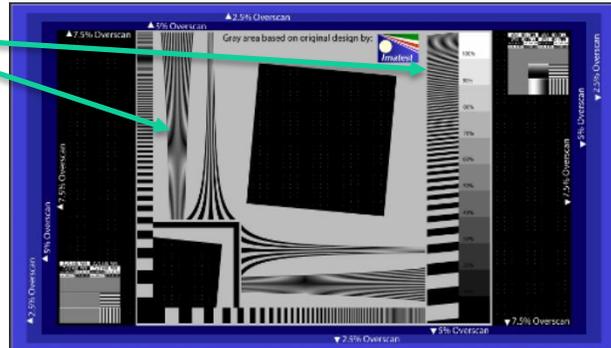
The resolution sections in the top left and bottom right corners of the pattern provide a reference to verify that 1 pixel wide lines can be clearly viewed at the selected resolution. If your signal resolution is the same as the display's native resolution, you should be able to see distinct lines inside these areas, rather than them being blended together.



Click **Next** » to advance to the Sharpness page.

Sharpness

Use the display's Sharpness control in the Picture menu to assure that thin line edges in the pattern are neither fuzzy, nor bordered by bright white lines. These artificial ghosting lines appear when the sharpness has been set too high.



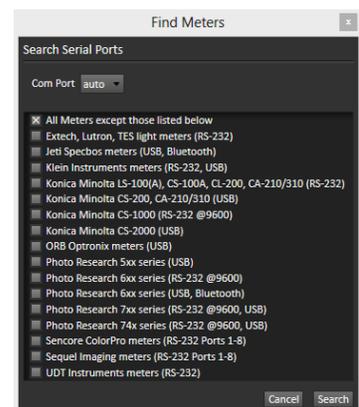
Click **Next** » to advance to the Meters information page.

Metered Settings

The next pages guide you through display adjustments that require a color meter. Display calibration software uses a light meter to take accurate readings of light and color quality. This tutorial walkthrough uses the SpectraCal C3 Colorimeter. (You can find the list of CalMAN supported meters [HERE](#)) The Meters information page provides the definitions of Tristimulus Colorimeters and Spectroradiometers. The SpectraCal C3 and C6 are both Tristimulus Colorimeters.

Click **Next** » to advance to the Meter Connect page.

Now you are ready to set up your color meter. Hang the color meter over the top of your television/monitor. Position the meter

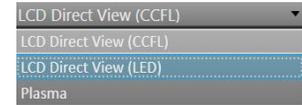


in the middle of the screen, flush up against the screen. (You can see meter positioning on the next page of the tutorial if you want to see an example before you continue.) After you plug your meter into your computer/laptop, be sure that the device driver loads properly.

Then, click the **Find Meter** button to bring up the Find Meters dialog. Here you will just click the “Search” button and not make any changes.



After your meter has been detected, click the Target Display Type dropdown to select the type of display you are calibrating. (It is important to connect to your meter before you select a display from the dropdown, as the connected meter will change the available options) Your meter will likely not need to be initialized.



Click **Next >>** to advance to the Meter Positioning page.

The next two pages go over meter positioning and what metered settings are. When you are done reviewing these pages, click **Next >>** to advance to the Color Temperature page.

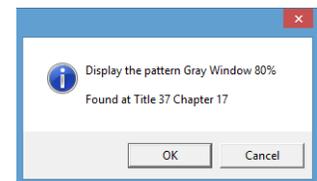
Color Temperature

To adjust color temperature on your display, find the color temperature settings on your display’s menu. There should be several modes in this setting category, and will either contain settings labeled with specific color temperature values (5500, 6000, 6500, 7000, etc.) or with generic titles (a, b, c, etc. or Warm 2, Warm 1, Normal, Cool 1, etc.). Select the lowest (most red) color temperature setting your display offers.

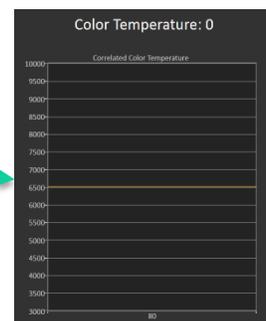
On the Color Temperature page, just above the “Back” and “Next” buttons, are a small group of buttons with the “Play” button active.



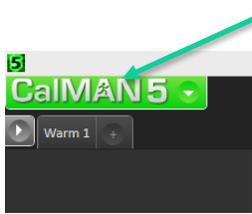
Hover above the button and you will see a button tooltip that reads “Read Single.” After you have selected a color temperature setting on your display, click the Read Single button to take a color meter reading of the display. This will bring up a pop-up that tells you what pattern to select on your AVS HD calibration disc. After you have the correct pattern up on your screen, click OK to take the reading.



When the meter has completed its reading, the results will show on the graph on the right-hand side of the workflow page. The target color temperature for these adjustments is 6500 Kelvin.



On the “History” tab in the top left of the workflow page, label the reading with the display’s current color temperature setting. Then, create a new tab for a second reading by clicking the new tab button to the right of the first History tab.



Select the next color temperature setting on the display. Repeat the process above, taking readings for every color-temperature setting on your display. Compare the readings by switching back and forth between the newly created History tabs, and find the reading that most closely matched the 6500 Kelvin. Whichever color temperature setting rendered the closest reading is the setting you need to select for your display.

Click **Next »** to advance to the Gamma Select page.

Gamma Select

The gamma settings on a display allow the viewer to tailor the display’s output to the lighting of the viewing environment. For instance, a dim room will require a different gamma setting than a bright room. For the purpose of this tutorial, our goal is to hit 2.4, where the gold line is located on the chart.



To test the gamma settings on your display, click the “Read Series” button  on the bottom right of the Gamma Select page.

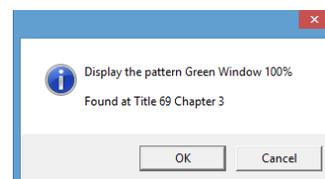
Note the measured gamma recorded by CalMAN and its variance from the target gamma. If the measured and target gamma don’t match, select a different gamma setting from your display’s picture menu, create a new history tab (as explained above) and run the gamma measurements again. Repeat for each of the display’s gamma settings, creating a new History Tab for each gamma setting, until you have determined which gamma setting measures closest to the target gamma.

Click **Next »** to advance to the Colorspace Setting page.

Colorspace Setting

Some displays may call this color gamut, or may not offer a Colorspace setting. If your display does not offer this, advance to the next page of the tutorial.

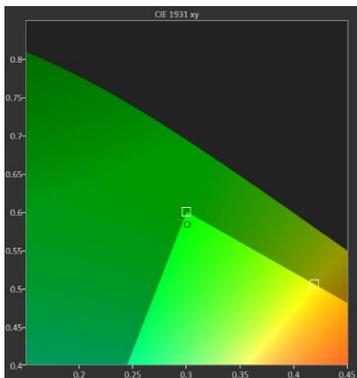
The first colorspace calibration in the Basic Tutorial Workflow is rather simple, just click the Read Single button at the bottom of your screen. A pop-up will tell you what pattern to select on



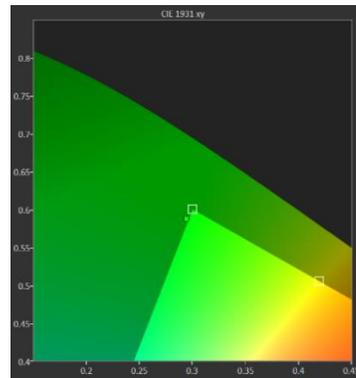
your AVS HD calibration disc. After you have the correct pattern on your screen, click OK to take the reading. Then, select another colorspace setting and click the Read Single button again to test the new setting. If two settings are both close to the square, use the one with the dot that is just outside the target triangle as opposed to the one just inside the target triangle. See the examples below.

Click **Next** » to advance to the Grayscale Adjust page.

Just Inside - Good



Just Outside - Better



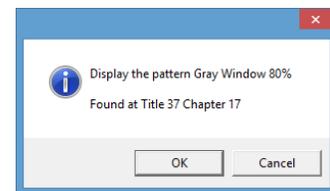
Grayscale Adjust

The CalMAN Basic Tutorial Workflow uses two points on a grayscale, 30% and 80%, to calibrate the RGB balance of your display. To begin the Grayscale calibration, locate the RGB controls on your display. The RGB controls will likely be found under White Balance, which may be in an Advanced Settings section. (Look for RGB Gain, Drive, Contrast, or High controls.)

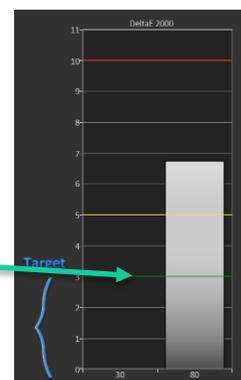
Select 80 from the bottom right corner of your screen, and then



press the “Read Single” button. The AVS HD calibration disc pop-up will tell you of which pattern to select. Click “OK” when the correct



pattern is on the screen, to take the reading. You want to balance the red, green and blue columns on the RGB Balance chart (it is usually best to adjust Red to match Green and adjust Blue to match Green). As you adjust, repeatedly click the “Read Single” button to adjust the Red and Blue bars to match the Green bar. Try to get

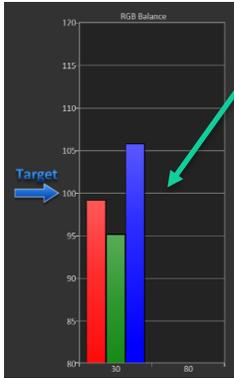
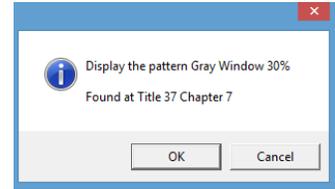


the DeltaE 2000 value below '3'. You do not have to get any lower than 3, because the human eye can hardly perceive changes below that threshold.

Now select 30 from the bottom left corner of your screen, and then



press the "Read Single" button. The AVS HD calibration disc pop-up will again tell you which pattern to select. Click "OK" when the correct



pattern is on the screen, to take the reading. Again, adjust the Red and Blue bars to match the Green bar. As you adjust, repeatedly click the "Read Single" button until all three bars balance as closely as possible and your DeltaE 2000 value is below '3'.

After you have finished balancing 30 and 80, go back and check both level adjustment to make sure your adjustment interactions have not caused your DeltaE



readings to move above 3.



Congratulations!

This concludes the walkthrough of the CalMAN 5 Tutorial Basic. You are now ready for Tutorial Advanced, where you will learn even more advanced techniques used worldwide in display calibration.